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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/801,843	03/16/2004	Michael Francis Xavier Gigliotti JR.	130445-1	3108

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EXAMINER
AUSTIN, AARON

ART UNIT	PAPER NUMBER
1775	

DATE MAILED: 06/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/801,843	Applicant(s) GIGLIOTTI ET AL.	
	Examiner Aaron S. Austin	Art Unit 1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 19-76, 78 and 79 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 19-76 and 78-79 is/are rejected.
- 7) ☒ Claim(s) 52 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

Claim 52 is objected to because of the following informalities: the recitation of "area reduction equal to" should read "area reduction ratio equal to" in line 8.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 19-21 and 23-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Gessinger et al. (US Patent No. 4,380,574).

Gessinger et al. teach a high-damping composite material consisting of a metal or metal alloy base, such as a steels, super alloy, titanium alloy, etc. (column 2, lines 62-66), which determines the strength and shape of the material and a metal or metal alloy surface layer, such as a memory alloy (column 3, lines 5-24) of which NiTi is an example (column 4, line 63), surrounding the base material. The surface layer may be applied by electrolytic or other means, such as plasma spraying and dense-sintering (column 4, lines 34-48). A diffusion barrier layer may be used between the base and the surface layer (column 4, lines 48-55). The surface layer material undergoes an austenite-martenistic phase transition (column 4, lines 58-61).

Claims 19-35 and 67 are rejected under 35 U.S.C. 102(b) as being anticipated by European Patent Application No. 1,054,077 A2 (EP '077).

EP '077 teaches a titanium alloy article, such as a turbine blade, comprising a protective coating of austenitic stainless steel over the blade and an oxide layer over the protective coating (abstract). The coating has greater toughness and ductility and improved ductile to brittle transition temperatures as well as reduced diffusion rates (paragraph [0034]). An intermediate (barrier) layer is used to further inhibit diffusion between the turbine blade substrate and the outer protective coating wherein the intermediate layer can be selected from a wide variety of metals (including niobium), nitrides, and oxygen-containing compounds such as silica (line 56 in column 4 to line 11 in column 5). The protective coating maybe applied by any of a number of methods including plasma spraying, cladding (extruding), hot isostatic pressing, electroplating, and chemical vapor deposition (paragraph [0036]). The coating may further comprise hard particles in the form of nitrides (paragraph [0046]). Alternating layers of the protective layer and titanium may be used (paragraph [0045]) along with the oxide/nitride containing layers (paragraph [0046]).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gessinger et al. (US Patent No. 4,380,574) in view of European Patent Application No. 1,054,077 A2 (EP '077).

Gessinger et al. teach a high-damping composite material as described above, but do not teach the composition of the diffusion barrier layer.

EP '077 teaches an intermediate (barrier) layer used to further inhibit diffusion between a turbine blade substrate and an outer protective coating wherein the intermediate layer can be selected from a wide variety of metals (including niobium), nitrides, and oxygen-containing compounds such as silica (line 56 in column 4 to line 11 in column 5). Therefore, as EP'077 clearly teaches a diffusion layer comprising elements as claimed provides the advantage of inhibiting diffusion between an alloy and a protective layer, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to use the diffusion layer taught by EP'077 as the diffusion layer taught by Gessinger et al. Thus the claimed invention as a whole is *prima facie* obvious over the combined teachings of the prior art.

Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over European Patent Application No. 1,054,077 A2 (EP '077).

EP '077 teaches a titanium alloy article as described above, but does not specify the size of the grains (nitride particles) used. However, it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the particle size

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for the intended application, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 37-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over European Patent Application No. 1,054,077 A2 (EP '077) in view of WIPO international patent application WO 99/66102 (WO '102).

EP '077 teaches a titanium alloy article as described above, including the use of hot isostatic pressing (paragraph [0036]).

EP '077 does not teach the claimed process parameters.

WO'102 teaches the usage of nickel-titanium intermetallic compounds as coatings on austenitic steel substrates and processes for their production including hot isostatic pressing (page 2, lines 24-28). The pressure, temperature, and timing of the process overlap the claims (page 3, lines 29-34 and claim 10). Heat treatment and aging are both used (claims 4 and 11).

Regarding claim 50, EP '077 teaches a titanium aluminide turbine blade as described above, but does not specify the size of the grains (nitride particles) used. However, it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the particle size for the intended application, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 52-66 are rejected under 35 U.S.C. 103(a) as being unpatentable over European Patent Application No. 1,054,077 A2 (EP '077) in view of WIPO international patent application WO 99/66102 (WO '102).

EP '077 teaches a titanium alloy article as described above, including the use of cladding (extruding) (paragraph [0036]).

EP '077 does not teach the claimed process parameters.

WO '102 teaches the usage of nickel-titanium intermetallic compounds as coatings on austenitic steel substrates and processes for their production including hot isostatic pressing as described above (page 2, lines 24-28). Both co-extrusion and hot isostatic pressing are pressure dependent processes that apply pressure over time and at various temperatures to produce a product. Therefore, as there is a direct relationship between the two processes, it would have been obvious to one of ordinary skill in the art to apply the parameters taught by WO '102 in the cladding process taught by EP '077.

Further, it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the process parameters for the intended application, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 66, EP '077 teaches a titanium alloy article as described above, but does not specify the size of the grains (nitride particles) used. However, it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the particle size for the intended application, since it has been held that

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discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claims 52 and 53, EP '077 teaches a titanium alloy article as described above, but does not specify the area reduction ratio. However, it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the area reduction ratio for the intended application, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 68-76 and 78-79 are rejected under 35 U.S.C. 103(a) as being unpatentable over European Patent Application No. 1,054,077 A2 (EP '077).

EP '077 teaches titanium alloy article as described above, but does not specify the size and shape of the titanium alloy article. However, it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the size and shape of the titanium alloy article for the intended application, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 76, EP '077 teaches a titanium alloy article as described above, but does not specify the size of the grains (nitride particles) used. However, it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the particle size for the intended application, since it has been held that

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discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 19-76 and 78-79 are rejected under 35 U.S.C. 103(a) as being unpatentable over WIPO international patent application WO 99/66102 (WO '102) in view of European Patent Application No. 1 054 077 A2 (EP '077).

WO '102 teaches the usage of nickel-titanium intermetallic compounds as coatings on austenitic steel substrates. The NiTi compounds possess excellent cavitation strength and good erosion resistance in various environments. According to WO '102, the NiTi compounds can be plated onto industrial equipment such as water turbine blades. Also, WO '102 states that NiTi compounds have pseudoelastic properties that vary according to the exact composition, microstructure, and temperature of the compound. See line 4 on page 1 to line 18 on page 5 of WO '102. WO '102 differs from the claims in that WO '102 does not provide a diffusion-controlling layer between the substrate surface and an erosion-resistant shape memory alloy layer.

However, EP '077 teaches the usage of an intermediate (barrier) layer between a substrate such as a turbine blade and an outer protective coating wherein the intermediate layer can be selected from a wide variety of metals, nitrides, and oxygen-containing compounds such as silica. See line 56 in column 4 to line 11 in column 5 of EP '077. The Examiner notes that the intermediate (barrier) layer compositions taught by EP '077 perform the same function (prevention of interdiffusion between the

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protective layer and the substrate) as the diffusion-controlling layer claimed by the applicants.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the teaching by WO '102 concerning the formation of a suitable reaction layer between the plating (shape memory alloy) material and the substrate surface during hot pressing (see lines 17 to 21 on page 4 of WO '102) as suggested by the usage of an intermediate (barrier) layer according to EP '077 because a barrier layer provides an improved bond between the outer protective layer and the substrate surface. A person skilled in the art of inorganic protective coatings for metal substrates would have been motivated to rely on EP '077 because an alternative bonding layer does not rely on the formation of a suitable reaction layer (as taught in WO '102) and the variety of barrier layer materials still permits diffusion-control between the shape memory alloy layer and the substrate surface.

Response to Arguments

Please note the present application has been reassigned to a different Examiner.

Applicant's arguments filed April 24, 2006 have been fully considered but they are not persuasive. In particular, Applicant argues the combination of WO'102 and EP'077 is improper on an analysis concluding the references teach away from each other. This conclusion is based on the belief that the WO'102 reference promotes the importance of a reaction at the boundary layer between the coating and the article while

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the EP'077 reference promotes removal of any reaction at the interface between the materials.

In contrast to Applicant's argument, it is believed that EP'077 does not in fact teach away from a reaction layer formed during hot pressing as described by WO'102. EP'077 does teach use of layers similar to those described by WO'102, with the primary difference being the existence of a diffusion barrier, all subjected to hot isostatic pressing as described above. The hot isostatic pressing serves to adhere the layers together and thus serves the same purpose as taught by WO'102 (the formation of a reaction layer between the surfaces to "bind the plating to the surface to be plated" - page 4, lines 17-21). While EP'077 does teach reduction/prevention of interdiffusion of the layers, it does not teach away from adhesion of the layers in a reaction layer between the materials. In fact, such a reaction layer is essential in the hot isostatic pressing process taught to form their invention. Therefore the prior rejections are maintained.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron S. Austin whose telephone number is (571) 272-8935. The examiner can normally be reached on Monday-Friday: 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ASA


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6/15/06